

We claim:

1 1. A method of identifying molecules, comprising:  
2 modifying a detectable property of a nano-scale fullerene structure;  
3 attaching the nano-scale fullerene structure to a reactive molecule;  
4 selecting the nano-scale fullerene structure as a result of preferential interaction between  
5 the reactive molecule and a sample molecule;  
6 placing the selected nano-scale fullerene structure on a substrate; and  
7 analyzing a surface of the substrate based on the detectable property to detect the nano-  
8 scale fullerene structure.

1 2. The method of claim 1, wherein the nano-scale fullerene structure includes a carbon  
2 nanotube.

1 3. The method of claim 1, wherein modifying a detectable property includes modifying a  
2 friction coefficient.

1 4. A method of identifying molecules, comprising:  
2 modifying a friction coefficient of a carbon nanotube;  
3 attaching the carbon nanotube to a reactive molecule;  
4 selecting the carbon nanotube as a result of preferential interaction between the reactive  
5 molecule and a sample molecule;  
6 placing the selected carbon nanotube on a substrate; and  
7 measuring friction characteristics of the substrate to detect the carbon nanotube.

1 5. The method of claim 4, wherein the sample molecule includes a DNA molecule.

1 6. The method of claim 4, wherein the reactive molecule includes an assay molecule.

1 7. The method of claim 4, wherein the operations are performed in the order presented.

- 1 8. The method of claim 4, wherein the friction coefficient of the carbon nanotube is  
2 modified after the carbon nanotube is attached to the reactive molecule.
- 1 9. The method of claim 4, wherein modifying the friction coefficient of the carbon nanotube  
2 includes increasing the friction coefficient of the carbon nanotube.
- 1 10. The method of claim 4, wherein modifying the friction coefficient of the carbon nanotube  
2 includes acid treating the carbon nanotube.
- 1 11. The method of claim 4, wherein modifying the friction coefficient of the carbon nanotube  
2 includes attaching a chemical species to the surface of the carbon nanotube.
- 1 12. The method of claim 11, wherein attaching a chemical species to the surface of the  
2 carbon nanotube includes attaching a carboxylic acid group to the surface of the carbon  
3 nanotube.
- 1 13. The method of claim 4, wherein measuring friction characteristics of the substrate  
2 includes atomic force microscopy (AFM) measurements of the friction characteristics of  
3 the substrate.
- 1 14. A method of identifying molecules, comprising:  
2 modifying electrical properties of a carbon nanotube;  
3 attaching the carbon nanotube to a reactive molecule;  
4 selecting the carbon nanotube as a result of preferential interaction between the reactive  
5 molecule and a sample molecule;  
6 placing the selected carbon nanotube on a substrate; and  
7 detecting the carbon nanotube using electrical surface detection techniques.

- 1 15. The method of claim 14, wherein modifying the electrical properties of the carbon  
2 nanotube includes acid treating the carbon nanotube.
- 1 16. The method of claim 14, wherein detecting the carbon nanotube includes detecting the  
2 carbon nanotube using scanning tunneling microscopy (STM) measurements.
- 1 17. The method of claim 14, wherein the sample molecule includes a DNA molecule.
- 1 18. A molecular identification assembly, comprising:  
2 a reactive molecule;  
3 a carbon nanotube attached to the reactive molecule; and  
4 a chemical modifier attached to the carbon nanotube, the chemical modifier altering the  
5 friction coefficient of the carbon nanotube.
- 1 19. The molecular identification assembly of claim 18, wherein the reactive molecule  
2 includes an assay molecule.
- 1 20. The molecular identification assembly of claim 19, wherein the assay molecule is adapted  
2 to combining with portions of a DNA molecule.
- 1 21. The molecular identification assembly of claim 18, wherein the chemical modifier  
2 includes a carboxylic acid group.
- 1 22. The molecular identification assembly of claim 18, wherein the friction coefficient is  
2 increased.
- 1 23. The molecular identification assembly of claim 18, wherein the friction coefficient is  
2 decreased.

- 1 24. A method of forming a molecular identification assembly, comprising:  
2 modifying a friction coefficient of a carbon nanotube; and  
3 attaching the carbon nanotube to a reactive molecule.
- 1 25. The method of claim 24, wherein attaching the carbon nanotube to the reactive molecule  
2 includes attaching the carbon nanotube to an assay molecule adapted for combining with  
3 portions of a DNA molecule.
- 1 26. The method of claim 24, wherein modifying the friction coefficient of the carbon  
2 nanotube includes increasing the friction coefficient of the carbon nanotube.
- 1 27. The method of claim 24, wherein the operations are performed in the order presented.
- 1 28. The method of claim 24, wherein the friction coefficient of the carbon nanotube is  
2 modified after the carbon nanotube is attached to the reactive molecule.
- 1 29. The method of claim 24, wherein modifying the friction coefficient of the carbon  
nanotube includes acid treating the carbon nanotube.
- 1 30. The method of claim 24, wherein modifying the friction coefficient of the carbon  
2 nanotube includes attaching a chemical species to the surface of the carbon nanotube.
- 1 31. The method of claim 30, wherein attaching the chemical species to the surface of the  
2 carbon nanotube includes attaching a carboxylic acid group to the surface of the carbon  
3 nanotube.